BWR/X
VSBWR
Very Simple Boiling Water Reactor

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Enabling Advanced Reactors for the Market

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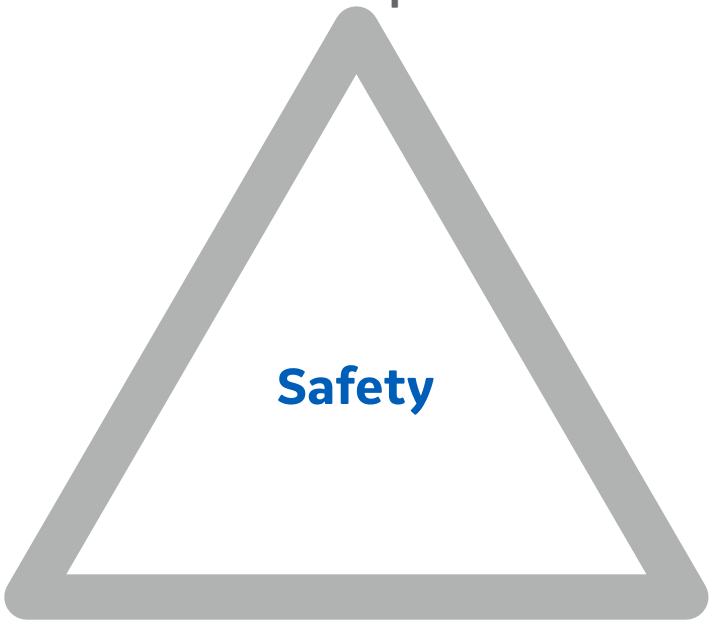
This presentation regarding the Very Simple BWR is intended for discussion purposes only and the information it contains is subject to change. Accordingly, the information and data contained herein are merely conceptual and indicative. They do not take into account customer specific requirements, commercial terms with the customer or suppliers, or regulatory requirements. No warranties or guarantees are expressed or implied as to the accuracy of the estimates or the viability of any actual potential project.

In the near term … which SMR can offer all of these?

Gas-comparable LCOE
and lower capital cost



Proven components
Reactor design, fuel design and passive safety

Simplicity
Simpler to manufacture, construct, operate and maintain

VSBWR design goals

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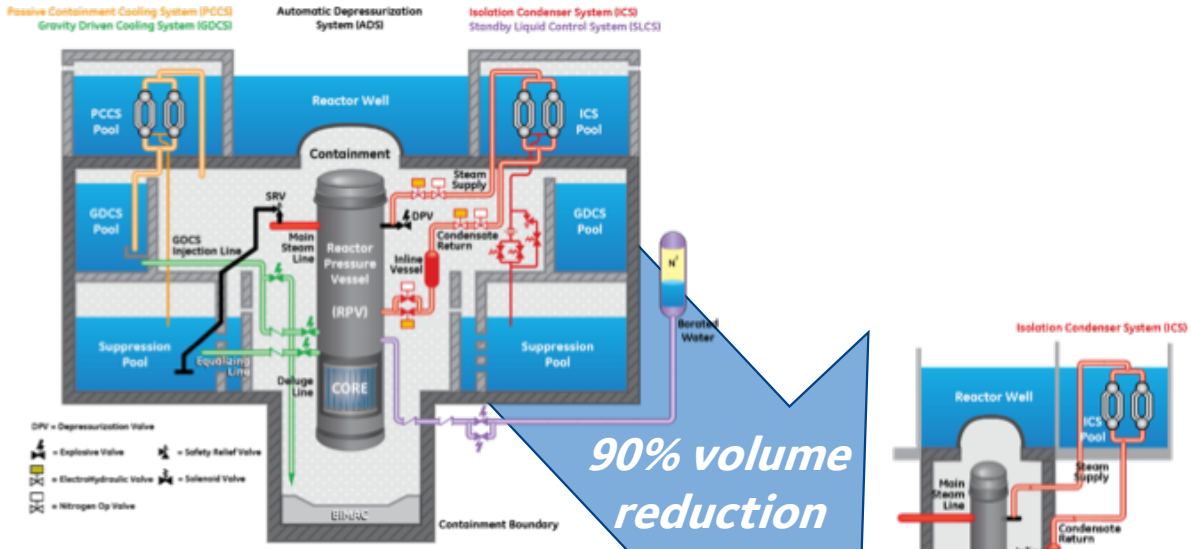
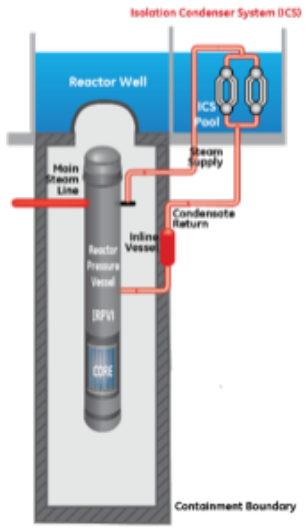
A dramatic reduction in scale and complexity vs ESBWR



ESBWR

161,000 m³



VSBWR

15,500 m³

VSBWR design principles

- **300 MW Small Modular BWR**
- **Designed to <u>eliminate LOCA</u>**
- **Design-to-cost'** … think like a startup
- ESBWR design/licensing basis
- Underground/concrete security
- Natural circulation
- Isolation Condenser System cooling
- Small, dry containment
- Rethink control systems … passive controls
- Design for 'off-the-shelf' TI/BOP
- Goal of 75 onsite staff

Compared to ESBWR:
>50% building volume reduction/MW
>50% less concrete/MW

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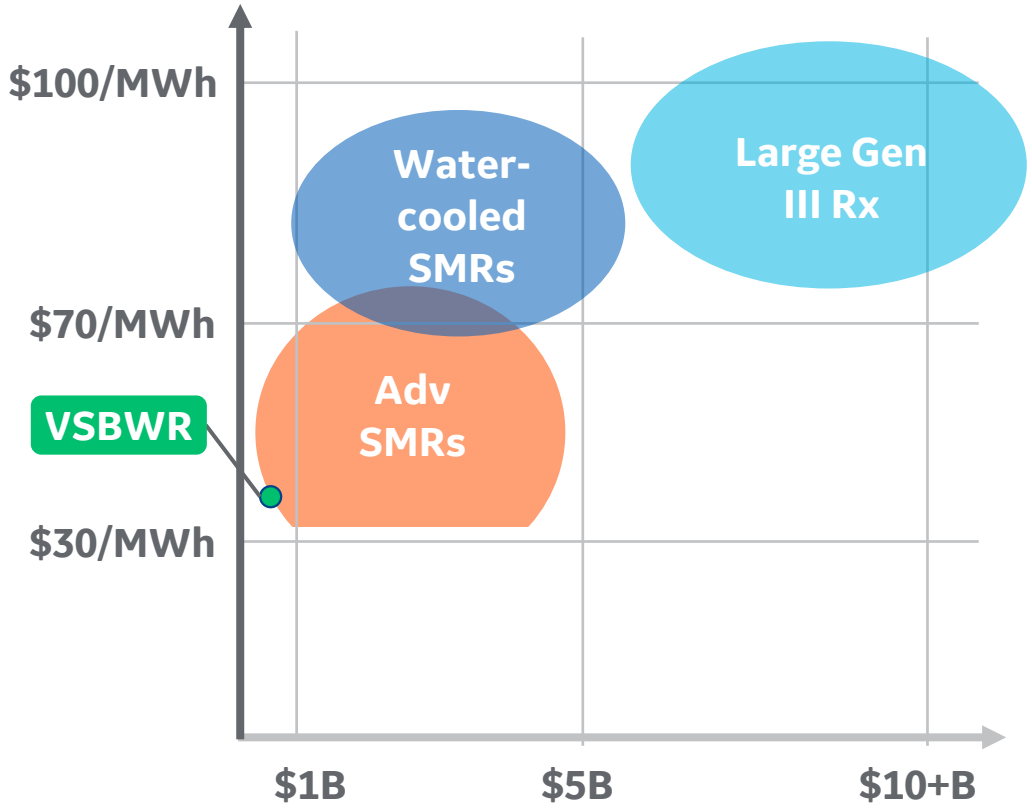
Patents Pending

VSBWR …
Targeting competitiveness with gas near term



	VSBWR	Passive-safety large LWR
Key Design Basis	ESBWR	Developed
Fuel	Same	Proven
Passive Safety	Passive w/o DC power	3-7 days
Emergency Planning Zone (EPZ)	Site boundary	10 mi.
Capital Cost	60+% reduction /kW	$8+B
O&M	~75 staff <$16/MWh	599-1,000 staff
Security	Limited	Large security force (Gen II style)
Licensing	Limited testing needed; Utilize ESBWR licensing basis	Complete
Detailed Design	~75% cost reduction	Complete
BOP	Small and simplified; 'off the shelf'	Custom, large components
Modularization	Simplified modularization	Complex

Simpler … Smarter … Lower cost *while utilizing ESBWR's 30+yr development basis*

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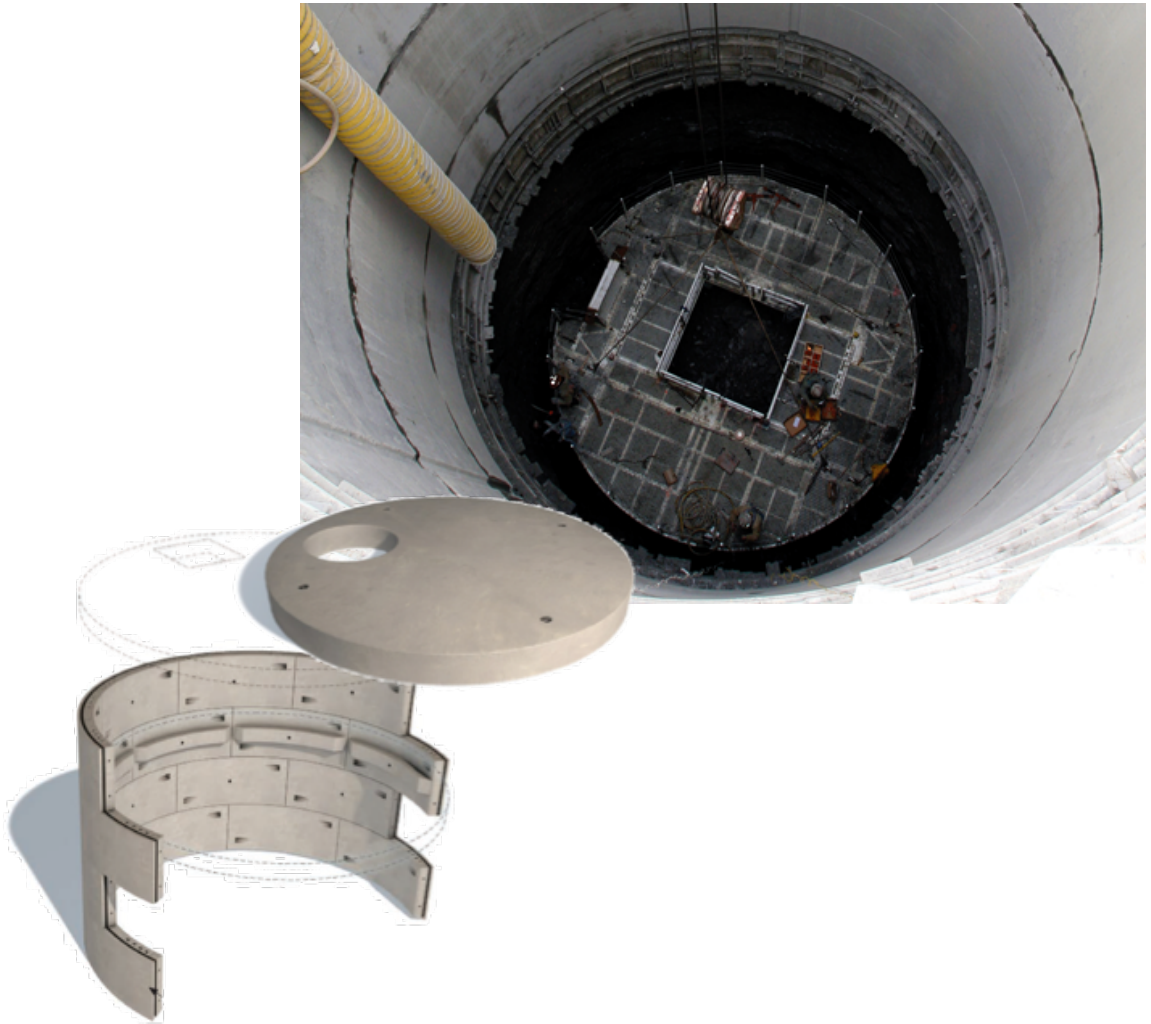
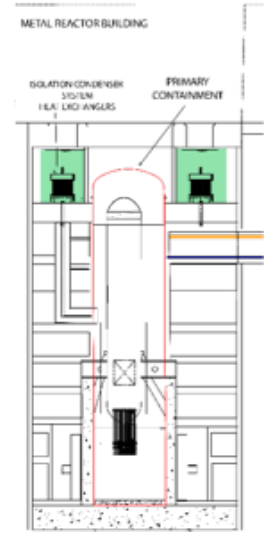
Simpler and more affordable to construct





Single large ~20m circular or square shaft

- Conventional blast/dig/pour … ~**$4-6MM in 6-9m**
- Common construction in other industries
- Earth provides natural protection from threats and lowers concrete volumes
- Power island ~ footprint of football field
- 900MWt size enables flexible water requirements … e.g. dry-cooling towers

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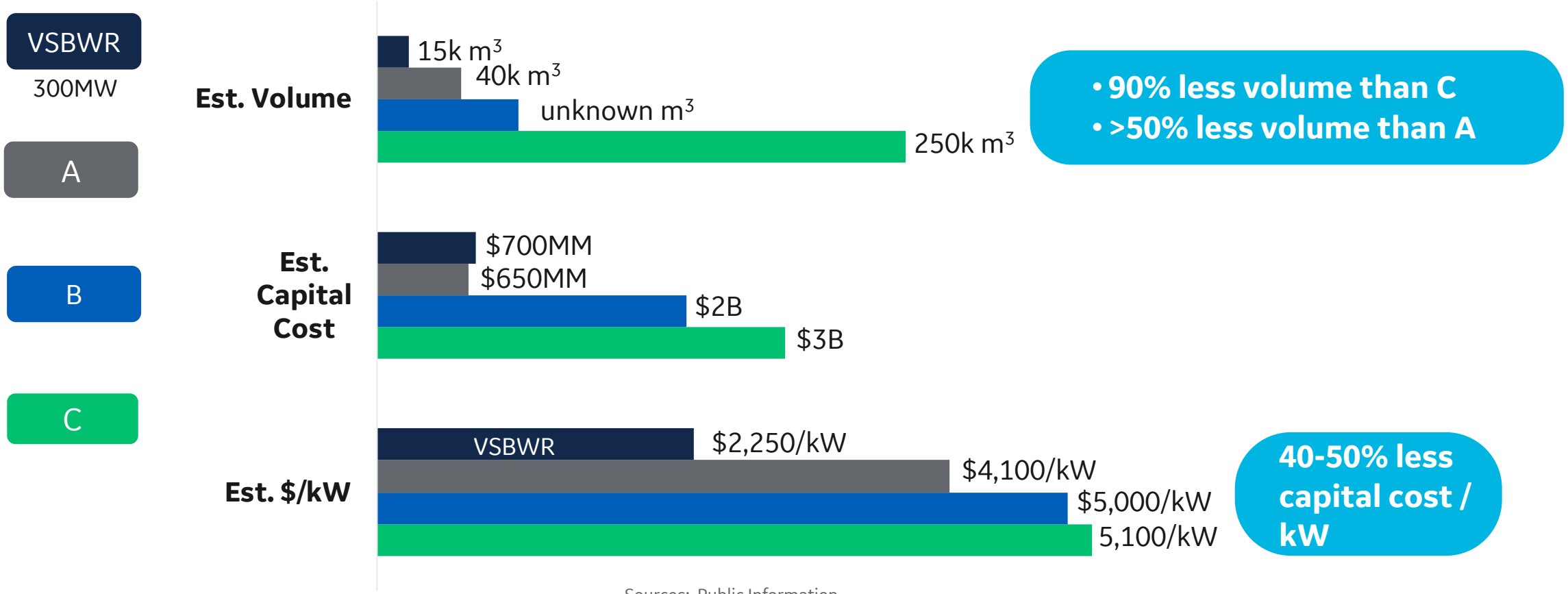
VSBWR compared to PWR SMRs



Sources: Public Information

PRISM team ready for test reactor deployment

Advanced Demonstration and Test Reactor Options Study

January 2017

Prepared by:

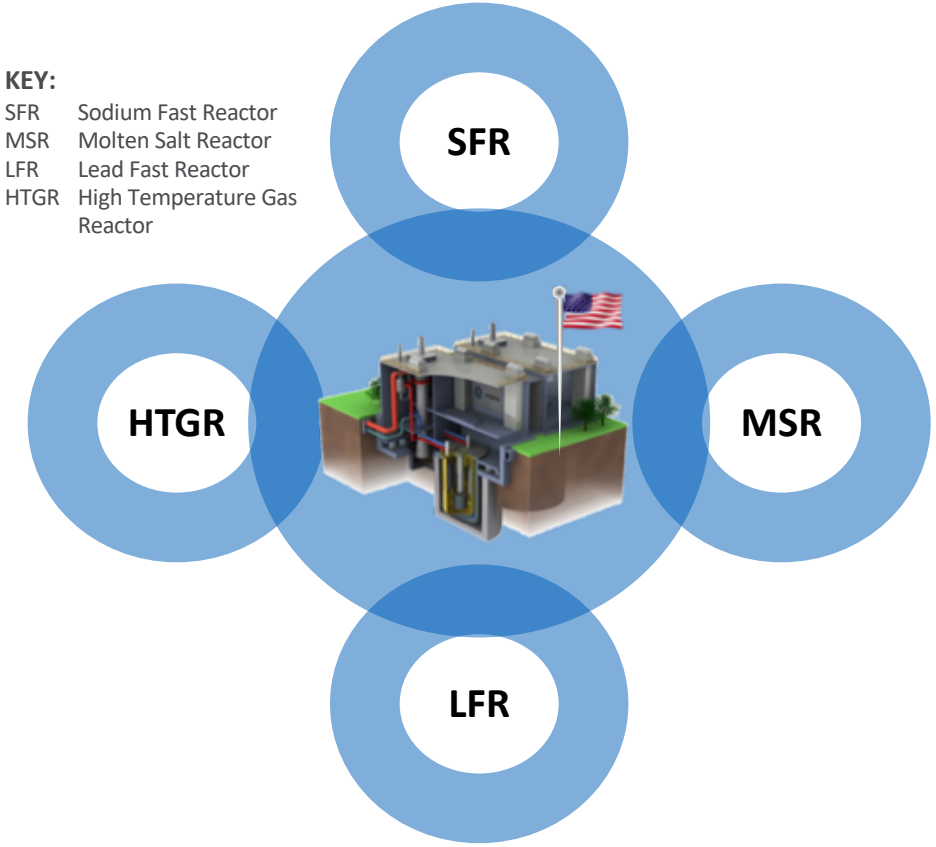
Argonne NATIONAL LABORATORY

INL Idaho National Laboratory

OAK RIDGE National Laboratory

KEY:

SFR	Sodium Fast Reactor
MSR	Molten Salt Reactor
LFR	Lead Fast Reactor
HTGR	High Temperature Gas Reactor



HITACHI — Nuclear systems design engineering

Exelon Generation — Operations and maintenance

HIGH BRIDGE ENERGY DEVELOPMENT COMPANY, LLC — Development lead and project management

AECOM — BOP design engineering and construction

EXCEL SERVICES CORPORATION — Licensing and technical support

The right technology and team to make progress benefitting all advanced reactors

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